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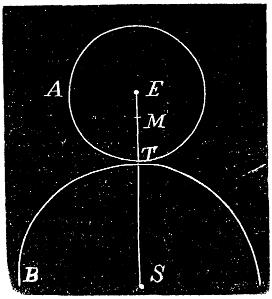
REPESENTATION OF THE MOON'S PATH ALONG THE LINE OF THE EARTH'S ORBIT.

BY OCTAVIAN L. MATHIOT, BALTIMORE, MARYLAND.

Let E represent the earth, S the sun, and ES the distance between them. On ES lay off ET so that ET : TS :: 1 : 13. Then is

$$ET : ES :: 1 : 14. \qquad (1)$$



With ET and TS as radii describe the circles TA and TB tangent to each other at T.

If we assume the moon's distance from the earth to be 240,000 miles and the earth's distance from the sun say 90,000,000 miles, these distances are as 1 to 375.

Let EM represent the moon's distance from the earth, then $EM : ES :: 1 : 375$,
and $ET : ES :: 1 : 14$, by (1); hence
$EM : ET :: 14 : 375 :: 1 : 27$, nearly.

Since circumferences are to each other as their radii, the circle AT will make 13 revolutions in rolling around the circle BT, and the point M will make 13 revolutions around the centre E during the same time.

If two such wheels are made and pointed pencils are fixd at E and M, by rolling AT toward the left around BT the pencil at M will describe the moon's path along the line of the earth's orbit as traced by the pencil at E.

A simpler plan is to cut from pasteboard any circle AT, and from centre E take $EM = \frac{1}{27}$ of the radius, insert pencils at E and M, and roll the circle along the inner edge of a black-board, and the relative path of the moon along the line of the earth's orbit will be traced.

Prob. 357 (p. 135, Vol. VIII).—"An elastic string without weight and of given length, has one end fixed in a perfectly smooth horizontal plane, and the other to a point in the surface of a sphere, the string being unwound. The sphere is projected on the plane from the fixed point with a linear velocity v and an angular velocity ω, winding the string on the circumference of a great circle; required the elongation of the string when fully stretched, and the subsequent motion of the sphere."